

***Tentative Identification of a Newly Discovered
Class of Material on Io***

L. Trafton

Io has a thin atmosphere which is supported by volatile ices on the surface, concentrated near active volcanos and the warmer subsolar latitudes. The newly discovered absorption feature in Io's spectrum at 2.1253 μm contrasts with the other known features from SO_2 , H_2S and H_2O in that it has not been observed to vary in strength over the 1.5 year interval since its discovery. Moreover, it appears to be uniformly distributed in longitude. Therefore, it represents a new class of absorption for Io and promises to reveal significant insights in the nature of the interaction among Io's surface, atmosphere, and volcanos. Volcanic activity is thought to explain the variability of the other absorptions, and to populate the plasma torus and Jovian magnetosphere. The uniformity of this feature suggests that it is widespread, at least in longitude. Laboratory experiments of various ice mixtures at Io's temperature rule out an origin from the known constituents, including various mixtures of the volatile ices. The most likely candidate appears to be clusters of CO_2 molecules. Observations are underway of the current series of occultations and eclipses of Io by other Galilean satellites (which occur only every six years, as the earth passes through the plane of the Galilean satellites) in order to locate the source of this newly discovered material on Io, which should provide further clues to its origin.